E=mC^2 for Information and Impact – Novel Theoretical Modelling Concepts in Information Entropy

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Abstract

Sensitive or unstable information have an impact in life in various fields, and they have the potentials to be used as a tool for reaching out to respective people in various situations. The study was performed to theoretically model the flow of sensitive information in various circumstances. The 'unstable' information like the 'unstable' nucleus have ability to disseminate and missionize the situations quickly and impact output factors in various fields. The output factor ΣE_i or 'the Information energy' can be modeled with the conventional energy equation (E=mC^2). The equation can be modified with addition of celebrity and humour factors to catalyse the spread of information. Angle corrections can be made for differences in celebrity views. Also, electromagnetic laws are applicable to information entropy in addition to the laws of thermodynamics for information entropy described by Shannon. With time as a factor and Laplace' transformations of time, there is a potential for informational stress test. Information promulgations can have alternating/ direct current (AC-DC), Laplace, and Fourier transformations in their transmission discourse. This report deals with the possibilities to model information's spread and output reactions and identifies potentials to overcome its negative impact and possible applications in the healthcare field.

Introduction

Information travel and impact needs to be studied and modeled theoretically. This can be utilized in various situations, for example, healthcare vaccination drives, etc. With the onset of modern technologies, information also travels at the speed of light — the info, when sensitive (m_s), can impact various situations by reactions. Conventional energy equation (E=mC^2) applies to atomic physics where particles travel at the speed of light (C), and m is the mass of the particles.[1-3]

Main article

The radioactivity of the elements is primarily due to high molecular weight or mass number of the trans uranium elements (n/p>1.4), and the subatomic particles in the outer surface of nucleus are unstable. When the nucleus of these elements is excited by neutrons the fission-reaction starts. Similarly, sensitive information or unstable information can spread fast and impact various factors, and can degenerate into numerable sub-information, especially when energy or thrust is given by celebrity. Like neutron bombardment, which starts the fission, and the fission reaction can be controlled by the released neutron absorption at regular intervals, information impact can be controlled by 'injecting' the celebrity factor into the information, and thereby the impact or reaction can be altered at periodic intervals. Conventional energy equation (E=mC^2) can be used to model the spread of sensitive information. Like particles are emitted during fission and travel at speed of light, sensitive information-theoretically also has the ability to spread exponentially, creating impact.

Information and energy

The information reactions or energy (E_i) exist, and it is challenging to quantify in absolute terms and, for the same reasons not well studied. However, the smallest energy (quantum) or reaction changes play a significant role in cumulative reaction formation. Similar to the field-matter interactions in the atomic quantum theory,[4] the psychological changes would encompass reactions to information especially when sensitive, which can be considered as a 'psychological' quantum theory. The simplest method to evaluate the E_i objectively is by questionnaire method. Similarly, the sensitivity of information and rumours can be studied and modelled in the appropriate context.

The energy equation can be modified to model energy output or impact sensitive information, such as catalyzing Covid19 vaccination drive. Since the general population is pessimistic, occasional side effects and coincidental deaths can be attributed to Covid19 vaccinations, especially when this happens to celebrities. More simply, a piece of negative information is absorbed more vividly by the mass than a positive instruction. The celebrity status (C_s) can be defined as the persons/organization/society with Twitter followers >100 000. Hence, one coincidental celebrity mortality not related to Covid19 vaccinations can be identified as potentially sensitive information, impacting many lives by enhancing informational energy or impact (ΣE_i). Consequently, this sensitive information or rumours can impact the Covid 19 vaccination drive, which considerably reduces the vaccination numbers irrespective of the educational status. If patients are not willing for Covid19 vaccinations traditional vaccines like influenza (H1N1)[5,6] and pneumococcal vaccines[7] also offer some protection against Covid19, especially in people not taking Covid19 vaccinations for various logistic reasons. The Covid19 injection drive was not promoted using celebrity-persons in any part of the world. The Covid19 vaccination drive in most countries is state-sponsored.

Celebrity has higher psychological quantum 'energy' accumulated through people-media/problem interaction over time, similar to field-matter interaction in atomic physics. Hence, the Covid19 vaccination drive would be accelerated using appropriate celebrities related to artists closer to people's emotions,[8,9] with positive body language than the conventional injection site photographs; the simplest would be advertisements. Inversely, when a celebrity or high-impact journal and media published recovery trial data[10] wherein 6mg once daily dose of dexamethasone up to 10 days is beneficial in Covid19 patients, dexamethasone as a lifesaving tool tends to be overused in significantly higher doses than recommended, especially in diabetes patients resulting in mucormycosis.

This unstable information can be reduced by humour (or humour factor H_f), which reduces the instability of the information. The information chain can also be reduced by counter-information by celebrities or by fusion technique through humours i.e. overcoming rumour by humour.

Hence, information energy or impact equation can be modified and written arbitrarily as,

$$\Sigma E_i = m_s\, C^2\, \Sigma C_s\, H_f$$

The celebrity factor could be varied with various and sometimes opposite view which requires correction. This can be represented with a correction angle factor, Cos θ.

$$\Sigma E_i = m_s\, C^2\, (\Sigma C_s\, Cos\, \theta) H_f,$$

wherein, Cos 0 =1 being positive entropy

The equation can be used for various health care applications for example, cardiovascular care, obesity control etc., which would mean a modification of E_i. Potential factors of modifications include sensitiveness of information or data, which can be created or modified. The dissemination of information can be altered by various methods of spread by electronic gadgets. The C_s can be altered by recruitment of appropriate celebrities with Twitter followers >100 000, and humour factor can be added, which can inversely affect the sensitiveness of the information. For example, in obesity control, self-inflicted or self-approved 'rumour with humour' algorithms using the terms 'watch belly', fatty tongue, monitor weight, reduce snoring, pot belly etc. given sequentially at timely intervals by artificial intelligence can remind the patient to be watchful of obesity. In routine patient encounters in clinical practice, most obese patients deny overeating. Similarly, the method can be used in the treatment of various disorders requiring vital behaviour modification techniques, such as diabetes care, alcohol dependence syndrome, anxiety or panic disorders, obsessive-compulsive disorders, etc.

Potential other applications include the process of peace appeal in various sensitive situations. The celebrity factor plays a major role, and art reduces the tension in any scenario. Humour catalyzes the process and causes fusion of the rumours, and the sensitivity of any triggering information can be downplayed.[9] The role of humour in resolving conflict circumstances is well known.[11]

Informational space

The surface area of the earth is 5.1 x 10^8 km^2. The space station is located about 400 km (1000/2.5) from the surface of the earth. Hence, the total area covered for information spread is approximately 2 x 10^{11} km^2. The speed of light (C) is 3 x 10^5 km/s, and C^2 would be 9 x 10^{10} Km/s. Hence, by giving arbitrary units, the above equation's ($\Sigma E_i = m_s C^2 \Sigma C_s H_f$) theoretical value would be strengthened. For example, a recent celebrity couple's divorce application, though sorrowful information, hits the media worldwide and possibly in all the 11 space stations and some satellites which are located at 800km from the surface of earth, in a very quick time. Hence, sensitive information's travel differs from standard information entropy,[12] which follows the 'throw of dice'/binary or Shannon's method and computation, and its modifications.[13]

This 'Einstonian' type of information entropy can also be seen in financial markets and associated with potential variations and corrections.[14,15] Financial celebrity emotions can impact market movements. The entropy economics has resulted in complexity in modern economics worldwide.[16] Some data may not be hilarious, but it can be perceived as a psychological inner-humour by people in their subconscious mind, especially when there is a significant positive financial-gradient associated between the origin and receipt of information. People would perceive information with inner-humour, for example, when celebrity characters like batman or spider-man/Avengers or regional cine-stars, etc., promulgate the information or Covid19 vaccination campaign. Stanley Milgram's results showed a similar output though critically acclaimed. The entropy of information with reverse financial-gradient is very challenging, and interestingly all religions across the world insist on simplicity.

Laws of electromagnetism

In the past information was not considered as energy or matter.[17] Most scientists, including Shannon in that era, believed that information entropy is a function of the laws of thermodynamics, and in any closed system the entropy does not decrease.[18] With the advent of cyberspace and network this concept has to be reconsidered. Information is not confined in a closed system, and it is free for communication across the world and space. The entropy of information is different and tends to polarize in various subgroups for example – men/women, financial/non-financial persons,

academic/corporate etc., and overlaps also exists to varying degrees. These large differences in entropy induce magnetic polarity (or 'gravity'- g_i) in information. Eddy currents of information can form in distant angulated locations, and eddy brakes may be applied by reversing polarity.[19]

Magnetic 'black holes' of information could exist, and the entropy could be invisible. This could be due to large variations in population density with bending or isolation of information, which is similar to singularity in quantum mechanics, where the entropy can be negatively infinite. For example, in the Covid-19's 3[rd]wave, robust data about breakthrough infections and lung involvement or mortality in Covid19 vaccinated individuals are not available to date (Feb, 2022) even in the preprints, even though the 3rd wave has started in most countries from Sept 2021. This data will not deter the Covid-19 vaccination campaign, and will facilitate physicians to be better prepared and supplement patients with routine vaccinations like influenza or pneumococcal or early remdisivir in selected patients.[20] Only minimal data about breakthrough infections in healthcare workers only is available. There are various mechanisms of black holes formation in astrophysics,[21] and a mechanism being intense bending of light by gravity creating black holes. Hence, the electromagnetic laws for magnetism[22] are applicable to information entropy, in addition to the laws of thermodynamics.

Electricity, Solid-State Battery and Garnets in information theory

The source of electricity generation for electromagnetism could be battery models, as information is not a continuous process. In battery technology, the current generates by the flow of charged ions towards opposite electrodes, i.e., anode to cathode. In this process of energy transfer, thermal/chemical reactions happen, the solutes can be oxidized, and resistance to current flow in the electrolytes and electrodes has to be considered. Hence, in solid-state electrolytes, garnets (LLZO, Li7La3Zr2O12, etc.) are used for better delivery of energy, less oxidation, least resistance, better lattice preservation, high energy transfer with less thermal or heat generation.[23,24] Even for cardiac pacemakers for the longevity of pulse generators, solid-state garnet technology could be used in the future. Similarly, informational garnets have to be considered in various circumstances of life for information entropy.

Information processing and artificial intelligence

In the psychological aspects of information processing, data associated with a positive financial gradient, or financial gain or psychological inner-humour or insecurity are associated with positive entropy. The mechanisms and perceptions of humour in general could be varied.[25] All these parameters can be studied and quantified through the questionnaire method. Psychological inner-humour, which is a common higher level of cognitive function, is not well studied by cognitive science/ neuroscience/psychology or interdisciplinary experts worldwide. This higher-level cognitive function is similar to other higher-level cognitive functions like dreams,[26] which are challenging to study efficiently. Large studies are required to further understand the significance, entropy, quantifications, applications and usefulness of this modifiable parameter.

Information entropy is the primary step in information processing and informational psychology. Now-a-days it is further influenced by artificial intelligence, and algorithms which could be sometimes associated with biases.[27] Based on this information entropy only, a paradigm of interdisciplinary cognitive psychology/skills can develop and transform into useful outcomes in day-to-day life.[28] Since artificial intelligence is developed by human programming, an inadequate understanding and entropy of information and normal human intelligence and psychology, which could result in major lacunae in artificial intelligence development in the future, which needs to be improved.

Hence with this discussion the energy equation can be written as

The energy equation, ΣTotal energy= ΣPotential energy + ΣKinetic energy

ΣE= mgh+1/2mv^2, where E is energy, m - mass, g - gravity, h - height, and v - velocity

which can be arbitrarily modified for informational energy as,

$$\Sigma E_I = m_s g_{i\ \Delta} f_g + m_s\, C^2\, \Sigma C_s\, H_f$$

where E_i is informational energy, m_s is sensitivity of information, g_i is gravity of information, $_\Delta f_g$ is financial gradient associated with information, C is speed of light, C_s is celebrity factor and H_f is the humour factor.

With differing opinion among celebrities, which could exist in any given situation the equation can be modified as

$$\Sigma E_l = m_s g_i \, _\Delta f_g + m_s \, C^2 \, (\Sigma C_s \, \text{Cos} \, \theta) \, H_f$$

Among these factors, speed of light (C) dominates as this is of high value (3×10^8 m/s). Only the parameter financial gradient when it is very high in the potential energy becomes a significant factor in information entropy. If the financial gradient ($_\Delta f_g$), is less then the element is incomparable to the speed of light, and the equation can be simplified as

$$\Sigma E_i = m_s \, C^2 \, (\Sigma C_s \, \text{Cos} \, \theta) \, H_f$$

In the opinion of the author, if a combination of these three factors i.e., positive financial gradient, or financial gain or psychological inner-humour or insecurity is observed and depending on the magnitude in a situation, the probability of positive entropy of the information is very high and information modelling would be a factor of E=mC^2.

Informational stress test

Information entropy is also associated with output reactions, which could be psychological or actions, which would be a function of time. In different circumstances, the time differentiation can be varied. For example, information associated with climate change, though not urgent, needs a correction in a few years. However, some other events based on the information requires early action. Hence, f(t) can be expressed as (0,∞).

The equation can be written as

$$\sum_{0}^{t} \delta E = MsC^2 (Cs \, \cos \theta) Hf / \int_{0}^{\infty} dT$$

Laplace transformation,

$$L \sum_{0}^{t} \delta E = L \sum MsC^{2}(Cs \, \cos \theta)Hf / \int_{0}^{\infty} L\,(dT)$$

or,

$$L \sum_{0}^{t} \delta E = L \sum MsC^{2}(Cs \, \cos \theta)Hf / \int_{t=0}^{\infty} e^{-st} \, f(t)dt$$

Time can be modified in a stress test as a function of variable time intervals. Laplace transformations can be applied to the time factor, and the equation can be further modified as an informational stress test in various situations. Laplace transformation[29,30] can help to identify the information transmission dynamics, and it can be amplified or divided based on the circumstances. For this, the decay time of the information has to be first observed (t), which varies in a different context, so that e^{-st} (t – time, and s - domain to convert input functions) can be estimated, and the data can be suitably amplified or reduced depending on situations. In most instances, these are performed based on the experience or intelligence of the individuals or organizations. Similarly, Fourier transmission of the information can also be performed, which can be mixing of data and amplification of selective information and vice- versa for decoding mixed information.[30]

AC-DC and information promulgation in artificial intelligence

Information promulgation can be performed by the electric current method. The flow of electrons in DC or direct current is unidirectional, and it encounters high resistance and energy during transfer than AC or alternating current. Alternating current has a sine-wave method of transmission with fluctuations in extremes of angle and direction, with the corresponding movement of electrons. AC has a potential advantage of lesser energy loss and resistance, and can be processed by transformers – step up and step down associated with magnetic electromotive force. Similarly, information promulgation and impact can be varied with extremes, and the time sequence can be changed so that it has the necessary output. Information that needs to be transmitted can be sent in alternating times between (magnetic) polar differences or variations –

men/women, academic/corporate, young/old, charity/financial institutions etc., and also in varying timings. This will be very useful for better information promulgation and impact.

Potential applications of these concepts could be observed in applying the principles for artificial intelligence development. Understanding information entropy and processes can have potential applications in health care, economics, marketing at various levels, psychological and neurobiological research, intelligent services, social media platforms, etc.

Limitations

The equation discussed is arbitrary and needs more evaluation and rigor in real-time and validation in large population models. The concept needs to be integrated with information entropy[31] and quantum information theory,[32] which deal with routine or normal/regular information only in a linear method, for better understanding and results. The equation needs to be applied in practical circumstances, and the applications need to be evaluated.

Conclusion

To conclude, there is a possibility to use the energy equation (E=mC^2) to model information and its output reactions, especially for sensitive information. Further studies are required to evaluate the applications of this concept in real-time.

List of Abbreviations

E$_i$ - Informational energy, m - Mass of the particle, C - Speed of light, m$_s$ - Sensitivity of information, E - Energy, C$_f$ - Celebrity factor, H$_f$ - Humour factor, $_\Delta$f$_g$ - Financial gradient, g$_i$ - informational gravity, AC – Alternating current, DC – Direct current

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